A catalogue and annotated checklist of the subfamily Agliinae Packard, 1893 (Lepidoptera: Saturniidae)

1. Review of the *Aglia* species with description of a new taxon from Sichuan, China

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Abstract: As a first part of a catalogue and checklist we provide an overview about the taxa of the genus *Aglia* Ochsenheimer, 1810 which we today accept on species level: *A. tau* (Linnaeus, 1758), *A. japonica* Leech, 1889, *A. homora* Jordan, 1911, and *A. **ingens*** **n. sp.** (male holotype to be deposited in Zoologisches Museum der Humboldt-Universität, Berlin, Germany) from Sichuan in China. Notes on their taxonomy, type specimens, distribution and a description are given, genitalia of all species are figured. The male **lectotype** of *A. japonica* (deposited in BMNH, London) and a male **neotype** of *A. homora* (in ZMHU, Berlin) are **designated**. Specimens of *A. ingens* and *A. homora* are figured in colour for comparision. In a second part we will publish the checklist containing all currently known entities within the genus, phylogenetic notes and a bibliography.

Key words: Saturniidae, Agliinae, *Aglia, japonica,* lectotype designated, *homora,* neotype designated, redescription, *ingens,* new species, checklist, phylogeny, bibliography, China.

Ein Katalog und kommentiertes systematisches Verzeichnis der Unterfamilie Agliinae Packard, 1893 (Lepidoptera: Saturniidae); 1. Überblick über die Gattung mit Beschreibung einer neuen Art aus Sichuan, China

Zusammenfassung: Als erster Teil einer Arbeit zur Gattung *Aglia* Ochsenheimer, 1810 wird ein Überblick über die derzeit von den Autoren auf Artebene anerkannten Taxa gegeben: *A. tau* (Linnaeus, 1758), *A. japonica* Leech, 1889, *A. homora* Jordan, 1911, sowie eine hier beschriebene Art *A. **ingens*** **n. sp.** (Holotypus Männchen wird ins Museum für Naturkunde der Humboldt-Universität, Berlin, gelangen) aus der Provinz Sichuan in China. Es wird ein Überblick gegeben zur bisherigen Taxonomie und Synonymie der Gattung *Aglia,* die vier Arten werden ausführlich besprochen, und die Verbreitung der Gattung wird dargestellt. Für *A. japonica* wird ein männlicher **Lectotypus** aus dem Natural History Museum, London, **designiert,** für *A. homora* ein männlicher **Neotypus,** der in das Zoologische Museum der Humboldt-Universität zu Berlin gelangen wird. Mehrere Falter von *A. ingens* n. sp. und zum Vergleich auch von *A. homora* sowie die männlichen Genitalstrukturen aller Arten werden farbig abgebildet. Der Artikel wird in einem zweiten Teil fortgesetzt, der eine ausführliche Checkliste aller vergebenen Namen der Gattung und eine ausführliche Bibliographie enthält und sich auch mit phylogenetischen Aspekten der Gattung befassen wird. Dort werden auch weitere Falter, vor allem solche, nach denen infrasubspezifische Namen vergeben wurden, abgebildet werden.

Introduction

The present catalogue and checklist is a first step to list and interprete all taxa described within the genus *Aglia* Ochsenheimer, 1810 to give a survey about this small group with so much taxonomic dead wood. During the last ca. 150 years more than 60 taxa and infrasubspecific entities were named within this genus, all described as subspecies, local or aberrative forms, "mutants" or "variations" of *Aglia tau* (Linnaeus, 1758), aside of a single taxon on species level: *Aglia tanus* Haworth, 1802. We will provide an overview about all those names and their current status in part 2. As a first attempt we give notes on those taxa which we accept on species level, and gather information about taxonomy, type material, morphology, and distribution.

The present publication is the first preparatory work for the volume on Saturniidae (and a few other bombycoid families) of the series "Handbook of Palaearctic Macrolepidoptera", the first volume of which was published recently (Špatenka et al. 1999). These preparatory contributions are intended

- to summarize the present taxonomic and nomenclatural knowledge of the group dealt with,
- to show up and possibly solve problems of species identities, lost type specimens etc., and
- to illustrate some of the type specimens, especially those never shown before, in colour; further
- to list all those many nomenclaturally invalid and unavailable names which cannot be reproduced within the "Handbook" series.

To prepare the "Handbook", there will be published revisions, descriptions of new species, and catalogues like the present one. Although there was always a lot of interest in research on the Saturniidae of Asia, it is quite remarkable how many truely Palaearctic or Chinese species formerly unknown have only recently been described (e.g., Brechlin 2001, Naumann 1998, 1999, 2001, 2003, Naumann & Bouyer 1998, Naumann & Kishida 2001, Naumann & Peigler 2001).

[1] 11th contribution to the Saturniidae fauna of China (10th contribution: S. Naumann [2003]: Two new *Loepa* species from Tibet and Shaanxi, China (Lepidoptera: Saturniidae). – Nachrichten des Entomologischen Vereins Apollo, Frankfurt am Main, N.F. **24** (4): 161–165.)

[2] 64th contribution to the knowledge of the Saturniidae. – Preparatory work for the "Handbook of Palaearctic Macrolepidoptera", Family Saturniidae, no. 1.

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The subfamily Agliinae is the only saturniid subfamily truely delimited to the Palaearctic region, aside from some overlap in the southeasternmost regions of distribution in Sichuan province of China where already subtropical faunal elements can be found; therefore the present work is, in fact, the only complete subfamiliar catalogue within the Palaearctic frame.

For the "Handbook" volume on Saturniidae the volume editor (W.A.N.) has chosen a "wide" concept of the Palaearctic area, including the Himalaya range, many of the mountains in the North of the Indochinese Peninsula and all of China (see schematic Map 1 for further details).

Abbreviations and conventions

‡	Unavailable name in the sense of the Code (ICZN 1999, 2000).
A < B	[Part of] collection A is [or will become] part of [or is included in] museum collection B.
BMNH	The Natural History Museum (formerly British Museum (Natural History)), London, United Kingdom.
CASB	Institute of Zoology, Chinese Academy of Sciences, Beijing, Peoples' Republic of China.
CBH	Collection Brosch, Hille, Germany.
CSNB	Collection Stefan Naumann, Berlin, Germany.
CWAN	Collection Wolfgang A. Nässig, in Senckenberg-Museum Frankfurt am Main, Germany.
ETHZ	Eidgenössische Technische Hochschule Zürich, Switzerland.
lfw.	Length of forewing in a straight line from the base of the wing to the apex, without the thorax width (usually measured on the right forewing, if this is not damaged).
MAKB	Museum Alexander Koenig, Bonn, Germany.
SMFL	Lepidoptera collection of Senckenberg-Museum, Frankfurt am Main, Germany.
SZMN	Siberian Zoological Museum Novosibirsk, Russia.
ZMHU	Zoologisches Museum der Humboldt-Universität zu Berlin, Germany.

Higher categories above the species-group

(In hierarchical and chronological order; the bibliography of the original descriptions will be shown in the checklist in part 2.)

Agliinae Packard, 1893

Type genus: *Aglia* Ochsenheimer, 1810.

Notes: A subfamily of Saturniidae Boisduval, 1837 ["1834"].

Agliini Packard, 1893

Notes: Formally a tribe of Agliinae Packard, 1893 – without significance for nomenclatural use. Originally established as subtribe Agliina of the tribe Hemileucini Michener, 1952 [error in authorship; misinterpretation] by Rougeot (1971).

Generic names

‡*Echidna* Hübner, [1806]

The only included species was *Phalaena tau* Linnaeus, 1758.

Notes: Not available; included in a work rejected for nomenclatural use by the International Commision on Zoological Nomenclature (1926: Opinion 97; 1952: Opinion 278; see ICZN 1987).

Aglia Ochsenheimer, [31 August] 1810

Original status: *Aglia* [n. gen.].

Type-species: *Phalaena Bombyx Tau* Linnaeus, 1758 by monotypy.

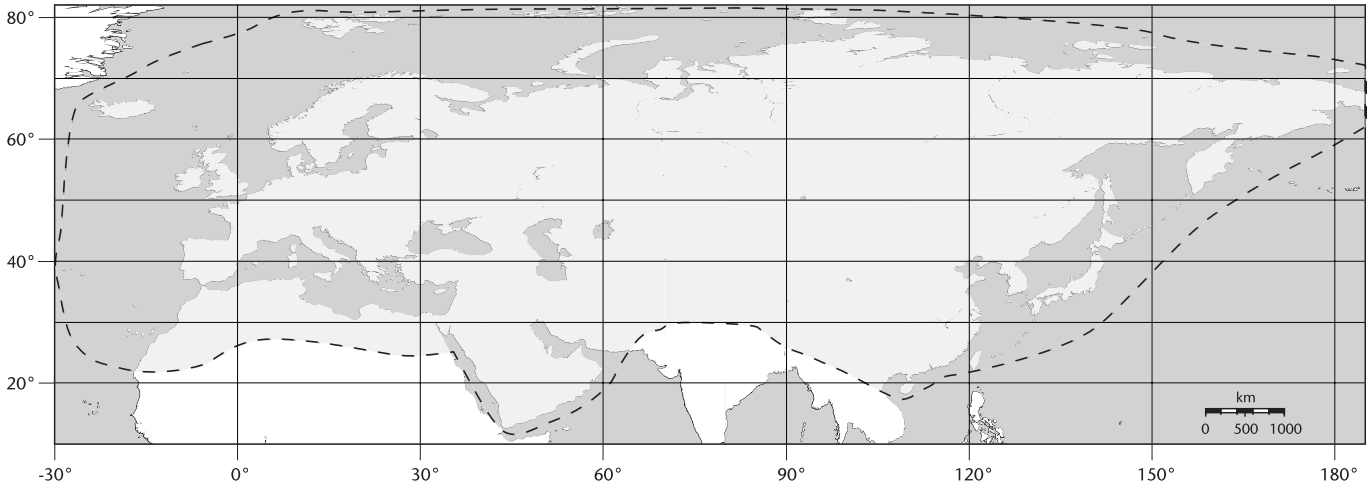
Type-locality: [Europe] – not explicitly stated in the original description.

Derivatio nominis: named for its white stigma in the eye, based on the Greek word ἀγλαία – shine, ornamentation (Spuler 1908: 110).

Tachyptena Germar, [20 October] 1810

Type-species: *Phalaena tau* Linnaeus, 1758 by monotypy.

Notes: junior objective synonym of *Aglia* Ochsenheimer, 1810.



Map 1: Delimitation of the Palaearctic Region as applied within the "Handbook" series, schematic. The Palaearctic Region for the use for Saturniidae comprises all of Europe including the Mediterranean islands, Africa north of the Saharan desert, the Near and Middle East including the Arabian Peninsula, Iran, Pakistan, Afghanistan, all of the Central Asiatic states formerly being part of the USSR, the Himalayan parts of India, all of China, also including the islands of Hainan and Taiwan, and several mountainous parts of the northern Indochinese Peninsula, all of the Japanese Islands, and Sakhalin and other Pacific islands close to the Siberian coast. – The Atlantic and Polar Sea islands (Iceland and other North Atlantic and Polar islands, also the Canary Islands, the Azores, Madeira etc.) are also included although they are not inhabited by any Saturniidae species. – Map drawed by W. Eckweiler using "OMC Online Map Creation" (Eckweiler 1998).

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‡*Aglaia* Kirby, 1884

Notes: incorrect subsequent spelling of *Aglia* Ochsenheimer, 1810, unavailable (ICZN 1999: Art. 33.3).

Taxa in the genus *Aglia* accepted on species level

In the following we list the four taxa we currently accept on species level and give some information about their nomenclature, type material, type localities, their distribution and a diagnosis. One species was found to be undescribed. All other names described within the genus *Aglia* on subspecific or infrasubspecific level will be listed and commented in the following checklist. At present, we interprete all those either as junior synonyms of *A. tau* and *A. japonica* Leech, 1889, or as not available in the sense of the Code (ICZN 1999, 2000).

Aglia tau (Linnaeus, 1758)

Original status: *Phalaena Bombyx Tau* [n. sp.]

Type-locality: [Europe] – not explicitly stated in the original description, but probably Sweden.

Type-specimens: No information on number and sex is given in the original description, and most likely no authentic type specimen remains in the different remnants of the Linnaeus collections. Anyway, the identity of this species never was in doubt, even without existence of a type specimen.

Derivatio nominis: Named after the T-like white marking in the center of the black and dark bluish eyespots on all wings (Greek T [= Tau]).

Diagnosis: The ♂♂ of ochreous to orange brown ground colour, but within the whole area of distribution there can be found melanistic specimens with either dark postmedian areas, or completely dark blackish brown wings, or any transitional stages of such darkening. Those variations led to several descriptions of individual forms, aberrations or "mutants" but are of no taxonomic value as no such variants can be reliably assigned to a special population. Several heredity studies on those interesting morphs were conducted proving the Mendelian heredity rules (e.g., Oberthür 1914, Standfuss 1909, 1914, 1917), and a lot of that material studied is kept in the collections of ETHZ.

A median band is rarely weakly indicated on the forewing upper side. In the centre of each wing there is a dark ocellus, ringed black outside, inner portion shining dark blue and with the typical white Tau-like marking. Ocelli of both fore- and hindwings are almost of the same size. Always the ground colour of the postmedian area is darker than that of the median area, with a shadow of interspersed black scales emerging marginally from the postmedian band. The ventral side is much lighter, suffused with white scales, and the black pattern elements aside the forewing ocelli completely missing. Antennae completely quadrupectinate, of around 43 segements. Forewing length around 30 to 36 mm.

The ♀♀ with the same markings, but of paler, ochreous brown ground colour; also in ♀♀ some more orange or darker colour variations can be observed. The antennae are much reduced bipectinate and consist of around 42 segments. Forewing length around 36 to 49 mm.

There is no strict correlation between the size or colour variation and the origin of a specimen, although in certain areas one morph may be found more often than elsewhere.

♂ genitalia (Fig. 22, 31): Uncus bifurcate, strongly sclerotized. Valves with narrow sacculus and round dorsal process. From the dorsolateral margin emerges an internal process which is bent in ventral direction and ends with a sharp, spiny, heavily sclerotized tip. Gnathos and transtilla are easily visible, they are fused centrally to a sharp tip. Juxta and saccus much reduced, which is reflected by a narrow, long aedeagus which is bent in ventral direction and ends in the posterior third with a row of small spines.

Preimaginal instars and ecology: Complete life histories of the species were published by, e.g., Gómez de Aizpúrua (1988) and recently by PN-SBN (2000) and Beeke et al. (2000). In both latter publications notes on behaviour, foodplants, and ecology were given. So we had to learn that *A. tau* is not at all confined to *Fagus* forests only (as often stated in literature, except Warnecke 1934), but can also be found in biotopes with several other deciduous foodplants, mixed conifer-deciduous forests, and in stripes of deciduous trees along rivers within otherwise unsuitable (coniferous) forest types (Füldner 2000, Beeke et al. 2000). While the ♀♀ are nocturnal, the ♂♂ of *A. tau* are diurnal and fly during sunshine only. In accordance with that behaviour (as usual for diurnal bombycoids, compare Nässig & Czipka 1994, Nässig 2000), the eyes of ♂♂ of *A. tau* have approximately the same size as those of ♀♀ of this species and are smaller than the eyes of the ♂♂ of any other *Aglia* species, while in *A. japonica* the ♂♂ have slightly, but clearly larger eyes than their ♀♀ (see Table 1).

Table 1: Eye diameter in *Aglia* specimens (± standard deviation). – Measured under a binocular microscope with micrometers. Measurement is difficult, because hairs and the fore legs may often cover the eyes. The data are based on specimens in SMFL where the eyes can be seen rather clearly.

Species/sex	Max. eye diameter horizontal [mm]	Max. eye diameter vertical [mm]	Notes
Aglia tau ♂♂ (n = 5)	1.05 ± 0.050	1.43 ± 0.057	German material only, no reared specimens
♀♀ (n = 5)	1.01 ± 0.022	1.45 ± 0.079	
Aglia japonica ♂♂ (n = 5)	1.35 ± 0.106	1.84 ± 0.096	Japanese material (mixed islands)
♀♀ (n = 2)	1.20/1.25	1.75/1.80	
Aglia homora ♂♂ (n = 5)	1.62 ± 0.097	2.09 ± 0.096	Shaanxi material only (Taibaishan)

Distribution: *A. tau* is the most widely distributed species of the genus; it ranges nearly all across the Palaearctic Region from close to the Atlantic coast in northern Spain and France to the Pacific coast in Russia (Siberia),

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northern China and Korea. Aside from literature records there exists material from nearly all countries in the authors' collections and in many museum collections which was examined. In the western Palaearctic, *A. tau* ranges south to Spain (e.g., Agenjo 1965, Gómez-Bustillo & Rubio 1979, Gómez-Bustillo & Fernández Vidal 1980, Gómez de Aizpúrua 1988), Italy (Raineri et al. 1995) and Greece (Schintlmeister 1996; CWAN). It is common and widespread in central Europe (e.g., Gaedike & Rougeot 1965, Leraut 1980, 1997, Rougeot & Viette 1983, de Freina & Witt 1987, Schintlmeister 1996, Heinicke 1999, Bělín 2003), southeastern Europe (Rebel 1906, 1908, 1911, 1916, Nässig 1983, Schintlmeister 1996), and northern Europe including the Scandinavian and Baltic countries (e.g., Aurivillius 1882, Staudinger & Rebel 1911, Schintlmeister 1996, Ivanov et al. 1999, Aarvik et al. 2000). No records exist for Portugal (Da Silva Cruz & Wattison 1934, Zerkowitz 1946, Silva Cruz & Gonçalves 1977), Great Britain and Ireland (Gardiner 1982, Goater 1992), Iceland, the Mediterranean islands of the Baleares, Malta, Sicily, Sardinia, Corse (Rougeot 1971), Cyprus, Crete and all other islands in the Aegean Sea.

The northernmost limits of the species are somewhere in the Taiga forests of Scandinavia and Russia, in the West Siberian plains up to 60°N, in Central Yakutia to 62°N (Dubatolov, pers. comm. to S. Naumann), in Finland even to 64°N (Marttila et al. 1990), while the southern limits in Asia are widely unknown. There are no reliable records of the species for Asia minor, and notes on northwestern Iranian specimens (see Rougeot 1971) are somehow doubtful, because no material from Elburz and Talesh mountains was ever seen by us or figured anywhere. No data are available either for the Central Asiatic states formerly being parts of the USSR and for Mongolia.

Most probably the southern distribution limits are ruled by precipitation and aridity, especially during spring and summer, while the northern distribution range is more or less continuous within the northern Taiga belt (Beeke et al. 2000). The species is frequently known from Ural (Nupponen & Fibiger 2002), the Siberian mountainous area north of the Mongolian borderline, from Ussuri and Amur areas (e.g., Staudinger & Rebel 1911), in China from the northern provinces Heilongjiang, Jilin, Liaoning southwestward to Shaanxi (Zhu & Wang 1983, 1993, 1996; specimens in coll. Brechlin, Pasewalk) where it flies syntopically with *A. homora* Jordan, 1911 in the Taibaishan area, and from both North and South Korea (e.g., Park et al. 1999). At present, probably the easternmost records for the species (specimens in CSNB) are from eastern Siberia, Magadan Oblast ("Tamtor, road to Chamdugan", localities which we were not able to locate on our maps, but which may be in extreme eastern Siberia).

Another interesting record is that of a single ♀ collected in Central Sakhalin Island, E. Sakhalin range, Krebtovty river, 300 m, 24.–28. vii. 2000, leg. Goshko (CSNB), which indicates that on this island both *A. tau* and *A. japonica* Leech, 1889 live syntopically; a ♂ of the latter was collected at the same time and place which clearly shows the specific status of the following species.

Aglia japonica Leech, 1889 ["1888"]

Original status: *Aglia tau* Var. *japonica* [n. var.].

Type-locality: [Japan: Hokkaido Island], Hakodate.

Type-specimens: 1 ♂, 1 ♀ syntypes ex coll. Pryer in coll. Leech, now in BMNH (examined by I. Kitching). Astonishingly, there are 1 ♂ and 2 ♀♀ conspecific specimens with identical data: [Japan, Hokkaido], Hakodate, June & July [18]87, native coll.; Leech Coll., 1900-64; in the original description only one pair with these data was mentioned, so obviously there came up an additional ♀ which was not counted at the time of describing the species. – That ♀ from BMNH which is figured by D'Abrera (1995: 101) as ♀ of *A. japonica* with origin "Hakodate" is in fact a specimen of *A. tau,* and it does not originate from Hakodate in Japan, but from Yevreysk A. O., near Birobidzhan [Russia, Far East] (pers. comm. I. Kitching); obviously D'Abrera did not only pick out the only misidentified specimen from the drawer of *A. japonica,* but then also quoted erroneous label data! – To avoid any further questions about the identity of *A. japonica,* we **hereby designate** the ♂ **syntype** with a wingspan of 75 mm as **lectotype,** and the bigger of the two ♀♀ with 103 mm wingspan as single paralectotype. The differing wingspans, compared to the original description, where 80 and 108 mm were noted, may be caused either by different measuring techniques or just by an earlier mistake. – Lecto- and paralectotype labels will be added accordingly.

Derivatio nominis: Self-explanatory, the species is named for its main distribution range: Japan.

Notes: The taxon was first used on specific level by Inoue (1958), but other authors followed him with that (e.g., D'Abrera 1995 [inconsistently: on the plate as subspecies, in the text as species], Dubatolov 1991). – There is some confusing information on the publication date by subsequent authors (e.g. Jordan [*in* Seitz] 1911, who listed 1888, or de Freina & Witt 1987, who erroneously cited 1899). According to the date given in the original description the paper was read on the meeting of the Zoological Society of London on 18th December 1888, but based on our examination of the complete original annual set of the journal the publication date must be cited correctly for 1889 (compare also D'Abrera 1995); the reading of a paper on a meeting alone does not qualify for a valid publication.

Diagnosis: Easy to distinguish from *A. tau* by the following characters: The ♂♂ are coloured more intensively orange, partly mixed with white scales in the basal and the apical areas of both fore- and hindwings. Almost always a median band is visible as a dark shadow. The hindwing ocellus is always larger, the forewing ocellus always smaller than in *A. tau* where both are of similar size (intermediate between the sizes of those of *A. japonica*), and the center is of a lighter violet blue, in the hindwing again with the typical white Tau-like marking while in the forewing this marking is more lenticular and small. The forewing has only a weak postmedian band, and the hindwing a broader dark grey one, with a dark shadow to the basal side, not to the marginal side as in *A. tau*. The ventral side darker brown, suffused with white scales on the hindwing and showing (probably like in all species of *Aglia*) a "dead leaf mimesis", lacking all black colour

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there, the forewing almost orange with the black ocellus. Antennae completely quadrupectinate, of around 37 to 39 segments. Forewing length around 32–37 mm. None of the darkened colour morphs found in *A. tau* are known for *A. japonica*.

The ♀♀ with same markings, either in the same orange ground colour as the ♂♂ or of a paler, more sandy ground colour. The antennae are much reduced bipectinate and consist of around 40 segments. Forewing length of around 44–48 mm.

♂ genitalia (Fig. 23): Very similar to those of *A. tau:* Uncus bifurcate, strongly sclerotized, perhaps the two ends a little rounder than in *A. tau*. Valves with narrow sacculus and round dorsal process. The internal process ends with a sharper and little longer tip (the internal processes in the valves are similar in *A. tau* and *japonica;* the differences between Figs. 23 and 23 are a preparatory artifact). Gnathos, transtilla, juxta, saccus and aedeagus all similar.

Preimaginal instars and ecology: The early instars were figured by Sugi et al. (1987); larvae look very similar to those of *A. tau,* the markings shown for last instar are coloured a little more intensively yellow. Foodplant notes refer to different deciduous trees but give no peculiarities. According to Y. Kishida (pers. comm.), the ♂♂ fly in the late afternoon/early evening (around 17–19 h), while the ♀♀ are on the wing after 22 h. The eyes of the ♂♂ of *A. japonica* are slightly, but clearly larger than those of the ♀♀ (see Table 1), and the external sexual dimorphism is less conspicuous than in *A. tau*.

Distribution: *A. japonica* is known from the Japanese Islands of Hokkaido, Honshu, Kyushu and Shikoku (Jordan 1911, Inoue 1958, Esaki et al. 1979, Sugi et al. 1987). The species was recorded also from the Russian island of Sakhalin and from Kunashir in the Southern Kuriles (Dubatolov 1991; specimens in SZMN), north of Japan. Specimens from central and southern Sakhalin in CSNB show no differences to Japanese *A. japonica* and are considered to be conspecific to those. In central Sakhalin *A. japonica* obviously lives syntopically with *A. tau*.

Aglia homora Jordan (*in* Seitz), 1911

Original status: [*Aglia tau*] *homora* subsp. nov.

Type locality: "West-China".

Type-specimens: Holotype ♀ by monotypy said to be in coll. Oberthür, figured in Études de Lépidoptérologie comparée (Oberthür 1909: fig. 223) under the name *japonica*. This specimen, to which Jordan referred in his original description, was not located thus far. The authors examined (without finding the specimen) several European collections including BMNH, Deutsches Entomologisches Institut Eberswalde (DEI), ETHZ, MAKB, Muséum d'Histoire Naturelle, Genéve, Muséum d'Histoire Naturelle, Lyon, Muséum National d'Histoire Naturelle, Paris, Naturhistorisches Museum Wien (Vienna), Oxford University Museum, ZMHU, Zoologisches Museum der Universität Hamburg and Zoologische Staatssammlung Dresden where potential type specimens originating from coll. Oberthür could be deposited. In Rennes, France, no collection is held at the local entomological society (P. Darge, pers. comm. to S. Naumann), so obviously the holotype of *A. homora* is lost or at least presently not available. — Unfortunately also the type locality as mentioned in the description is quite unprecise. Currently two ♀♀ are known to which the figure by Oberthür fits quite well, one from China, Gansu (Figs. 7, 8) in ETHZ, the other from China, Shaanxi (Figs. 11, 12) in MAKB, but both were collected after publication of the original description. Another ♀ of a different species described below is clearly different by its forewing ocellus and the larger size, and is classified with ♂♂ which clearly can be separated from those of *A. homora*. — To stabilize nomenclature and to fix the identity of *A. homora* (see also the notes on the misidentifications by Chinese authors below!) we decided to designate a neotype (according to ICZN 1999, 2000: preamble, Art. 75.1, 75.3) for that taxon which we chose from the locality of the largest series and to which the original ♀ fits best. The **♂ neotype** of *A. homora* (Figs. 13, 14), **designated herewith,** has the following data: China, Shaanxi prov., Tai bai shan Mts. (S), Tsinling-Mts., Foping Nature Reserve; 33,51°N/107,57°E [sic], 1500 m, 6.–20. iv. 1999, leg. V. Sinjaev & A. Plutenko, ex coll. Dr. Ronald Brechlin; collection Stefan Naumann [yellow]. It has a forewing length of 39 mm. A red neotype label will be fixed accordingly. This specimen (ex CSNB) will be deposited in ZMHU upon publication of the present paper, together with the holotype of the species described below. — The type locality in Shaanxi (fixed by our neotype designation) is not the westernmost known record of *A. homora,* but from this locality there is plenty of material available; we chose a ♂ specimen although the lost holotype was a ♀, because it is much easier to determine and separate the species by its ♂ genitalia.

Derivatio nominis: not explicitly given by Jordan (1911).

Notes: First raised from subspecific status by Mell (1940) due to the many structural differences in comparison to *A. japonica*. Mell still treated *A. japonica* as a subspecies of *A. tau,* and his genitalia figures 1 and 2 are interchanged (in fact, 1 is *japonica,* 2 is *homora*), but he delivered a valuable survey of *A. homora,* its behaviour and biotopes in the Taibaishan area and notes about the relationships within the genus to which we will refer later. — Zhu & Wang (1993) used the misidentified name *"A. tau ferenigra"* to seperate a second species from *A. tau* in China, noted for that taxon the provinces of Sichuan, Qinghai, and Gansu, but figured ♂ genitalia structures which clearly do not belong to the genus *Aglia* but most probably to *Cricula* Walker, 1855 or *Saturnia* Schrank, 1802. In their subsequent work (1996) they again mentioned *"A. tau ferenigra"* from the same proveniance, but now figured a drawing of the genitalia structures of *A. homora* and (on their colour plate IX, fig. 3) a ♂ which makes their misidentification visible; unfortunately, in the text they mentioned for Sichuan province also the locality Gongga Shan from where we describe another closely related species below, and from their low quality colour figure it is not absolutely clear which species is shown as no scale and no possibilitiy of direct comparision is given. Obviously both species were before Zhu & Wang when writing their manuscript.

Diagnosis: ♂♂ of *A. homora* (Figs. 9, 10, 13, 14) are of orange or ochreous to greyish brown ground colour, much less colourful than the two species above. Antennae dark ochreous or greyish brown, 12.0–12.5 mm (neotype 12.0 mm) long, quadrupectinate, with around 42 segments, length of rami 1.5 mm at maximum (neotype 1.5 mm). Head and thorax in ground colour, but labial palpi, tibiae and tarsi somewhat darker, greyish,

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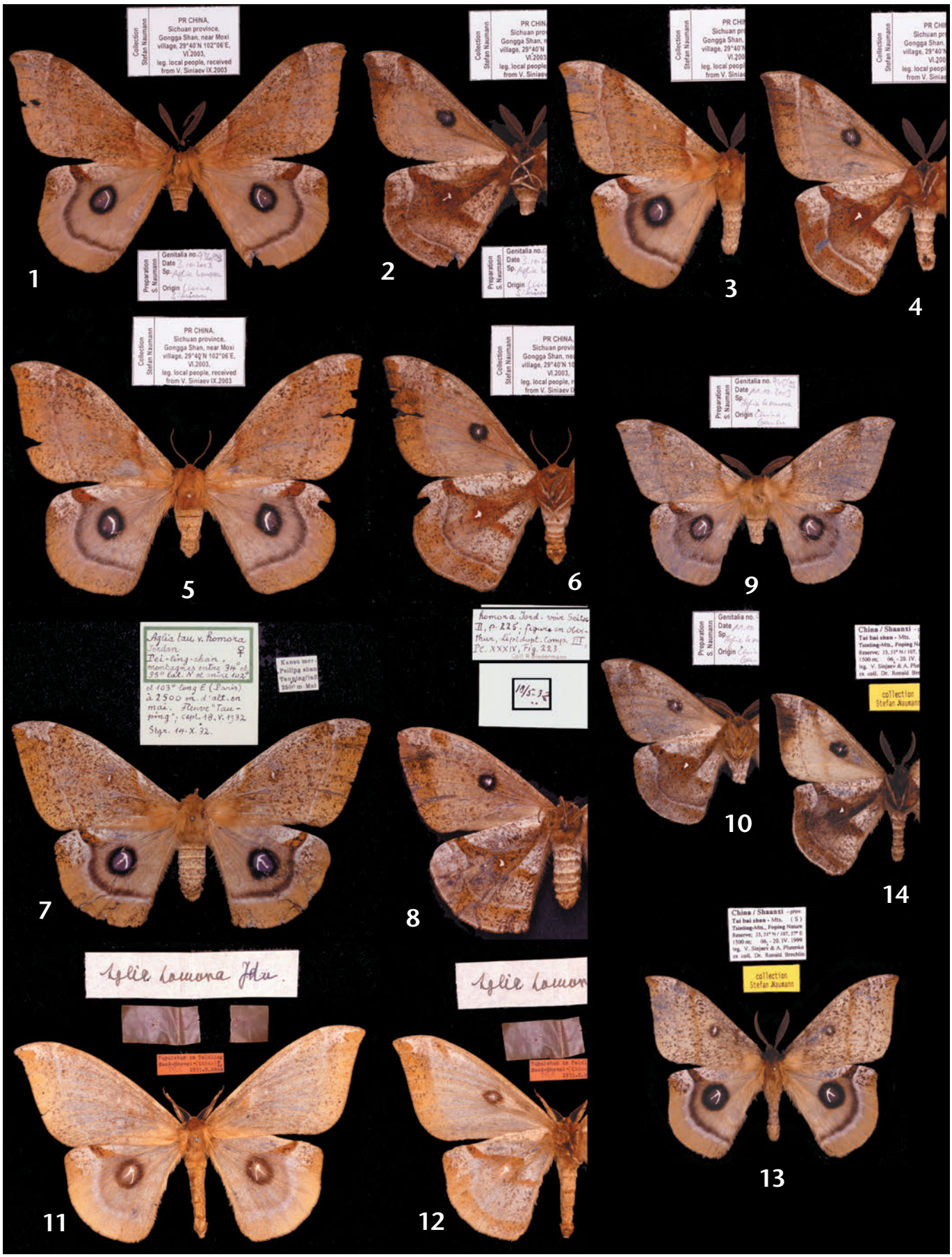

Colour plate 1: *Aglia* specimens. **Figs. 1–14:** *A. homora* & *A. ingens* n. sp. **Figs. 1–2:** *A. ingens,* holotype ♂, lfw. 52 mm, CSNB < ZMHU; Fig. 1 dorsal view, Fig. 2 ventral view. **Figs. 3–4:** *A. ingens,* paratype ♂, lfw. 51 mm, CSNB; Fig. 3 dorsal, Fig. 4 ventral. **Figs. 5–6:** *A. ingens,* allotype ♀, lfw. 57 mm, CSNB < ZMHU; Fig. 5 dorsal, Fig. 6 ventral. **Figs. 7–8:** *A. homora* ♀ from China, Gansu, lfw. 52 mm, ETHZ: Fig. 7 dorsal, Fig. 8 ventral. **Figs. 9–10:** *A. homora* ♂ from China, Gansu, Wudu, lfw. 40 mm, CSNB; Fig. 9 dorsal, Fig. 10 ventral. **Figs. 11–12:** *A. homora* ♀ from China, Shaanxi, Taibaishan, Höne leg., lfw. 48 mm, MAKB; Fig. 11 dorsal, Fig. 12 ventral. **Figs. 13–14:** *A. homora,* neotype ♂, China, Shaanxi, Taibaishan, lfw. 41 mm, CSNB < ZMHU; Fig. 13 dorsal, Fig. 14 ventral. — Photographs and scans U. Brosch & S. Naumann.

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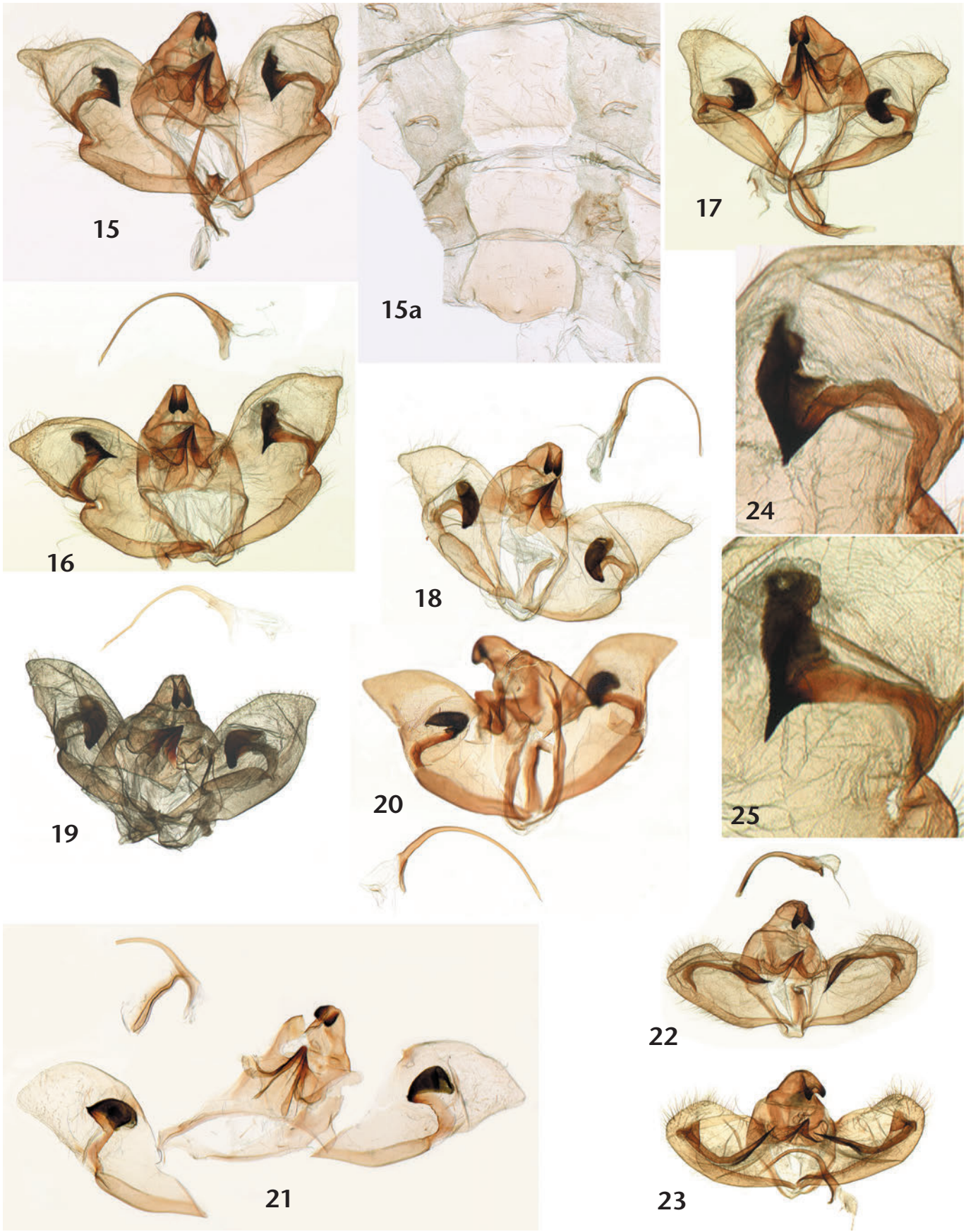

Plate 2: *Aglia*, ♂ genitalia. **Fig. 15:** *A. ingens* holotype, dissection no. 936/03 Naumann (CSNB < ZMHU). **Fig. 15a:** *A. ingens* holotype, dissection no. 936/03 Naumann (CSNB < ZMHU), abdominal pelt depicting the well-developed tergite of abdominal segment 8, forming a "hood" over the genitalia apparatus (bottom). **Fig. 16:** *A. ingens* paratype, no. 951/03 Naumann (CSNB). **Fig. 17:** *A. homora* from Shaanxi, no. 937/03 Naumann (CSNB). **Fig. 18:** *A. homora* from Shaanxi, no. 952/03 Naumann (CSNB). **Fig. 19:** *A. homora* from Gansu, no. 945/03 Naumann (CSNB). **Fig. 20:** *A. homora* from Sichuan, no. 1388/00 Nässig (BMNH). **Fig. 21:** *A. homora* from Sichuan, no. 1436/01 Nässig (BMNH). **Fig. 22:** *A. tau* from Finland, no. 932/03 Naumann (CSNB). **Fig. 23:** *A. japonica* from Japan, Honshu, no. 934/03 Naumann (CSNB). — All genitalia to the same scale. — **Figs. 24–25:** Enlarged details from the right valves of *A. ingens*. **Fig. 24:** Detail from Fig. 15. **Fig. 25:** Detail from Fig. 16. — Direct scans from slides.

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abdomen somewhat lighter. Length of right forewing 38–45 mm (average 41.8 mm ± 1.67 standard deviation, n = 29; neotype: 41 mm) in ♂♂ from Shaanxi and 40 mm in a ♂ from Gansu; ♂♂ from Sichuan: Emei Shan (in BMNH) are somewhat larger (40–55 mm, average 48.5 mm ± 6.24 s.d., n = 4). Length of the hindwing at anal angle 25–29 mm (average 26.5 mm, n = 6; neotype: 27 mm) in Shaanxi specimens. Forewing in ground colour, antemedian band somewhat darker, with a small whitish area anterior and mainly costally, median and postmedian area sprinkeled with dark greyish to reddish brown patches, the forewing ocellus a typical rounded dark greyish dot of around 3 mm diameter with a white lenticular centre. Postmedian area also in ground colour, only outer margin somewhat darker and more homogenous and in apical area whitish, apical tip falcate.

Hindwing sprinkeled only in the costal part where the postmedian line ends with an intensively coloured greyish to reddish brown patch. Median part hairy, in homogenous ground colour, eyespot nearly round, of 6.5–7.5 mm in diameter (average 6.75 mm, n = 6; neotype: 7.5 mm) in ♂♂ from Shaanxi, in the Gansu ♂ 7.0 mm. Outer ring black, inner part dark violet blue, with a typical Tau-like white marking, in few cases reduced to the form of a half moon. Postmedian band broad dark grey and white, postmedian area again homogenous in ochreous grey ground colour.

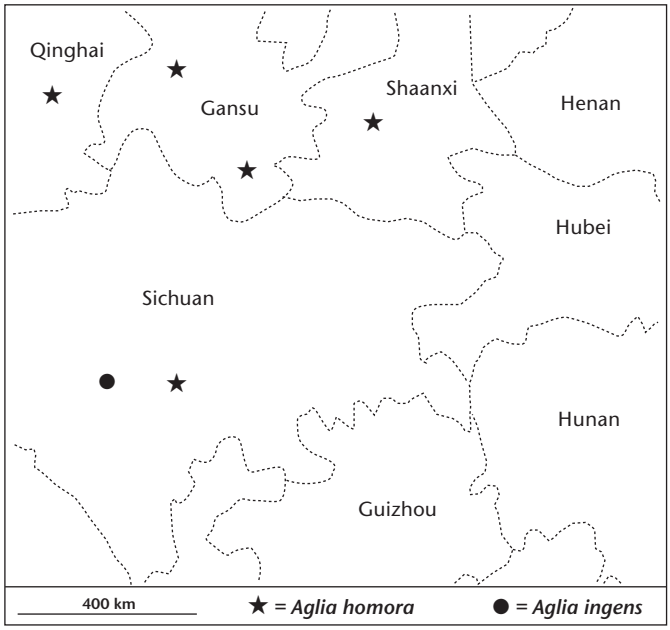
On the ventral side the forewings are more homogenous, show a typical dark eyespot, and the hindwing is coloured more intensively, sprinkeled with patches, and has no eyespot, but shows a white marking.

The ♀ (Figs. 7, 8, 11, 12) manly differs from the ♂♂ by the typical sexual dimorphic characters such as larger size (forewing length of the two specimens we had in our hands: 48 and 52 mm), forewings rounder, and antennae bipectinate, about 11 mm long. The forewing ocellus clearly visible as dark bordered white dot, the hindwing ocellus with a typical large white Tau. The overall ground colour is somewhat less pale and little more ochreous or reddish.

♂ genitalia (Figs. 17, 18, 19, 20, 21, 26–30): As already figured out by Mell (1940) the genitalia are typical for the genus but differ in some particuliarities from those of *A. tau* and *A. japonica*. This is mainly the larger size, and the typical internal process of the valves which ends much shorter with a rounded, heavily sclerotized and dorsally and ventrally scobinate tip (Figs. 26–30). Generally the uncus is bifid, transtilla and gnathos are fused, valves at their dorsal apex rounded, not much curved outwardly. Saccus and juxta much reduced, the aedeagus long, thin and bent to the ventral side. The tergite of the 8th abdominal segment is well developed, more intensively sclerotized than the other tergites, and the genitalia are normally hidden under this cover, similar to the genus *Antheraea* Hübner, 1819 ("1816") where a similar "hood" is described (Nässig 1991); from there the genitalia can be everted.

Preimaginal instars and ecology: Nothing is known about preimaginal instars and foodplants, although it should be expected that the larvae of the species have similar deciduous foodplants as their northern relatives *A. tau* and *A. japonica* (Mell 1940). Both sexes of *A. homora* are nocturnal. The eyes of the ♂♂ are not visibly smaller than those of the ♀♀.

Distribution: *A. homora* is known from mountainous areas of the western Chinese provinces of Shaanxi, Gansu, Qinghai, and Sichuan (Jordan 1911, Mell 1940, D'Abrera 1995, Zhu & Wang 1996) (Map 2). Most material was collected during the last 5 years in the Taibaishan area of Shaanxi (type locality by neotype designation), all specimens were collected there in April and May at altitudes of 1500 to 1600 m. Specimens are, e.g., in the collections of the authors, the neotype ex CSNB will be deposited in ZMHU. Older material from Taibaishan was mentioned by Mell (1940), specimens were found in June [1935] at altitudes from 1700 to 3500 m; only small remnants of the series collected by Höne have so far been located in MAKB, most specimens are presently unlocated.



Map 2: Distribution of *Aglia homora* and *Aglia ingens* n. sp. in China.

Material from other provinces is hard to find in western collections: 1 ♀ from Gansu, Peilingshan, Taupingfluss, 2500 m, "montagnes entre 34° et 35° lat. N. et entre 102° et 103° long. E.", 18. v. 1932, coll. Biedermann (ETHZ); 1 ♂ from Gansu, 70 km W Wudu, 1.–13. vi. 1987, ex coll. Thierry Bouyer (CSNB); 4 ♂♂ from Sichuan, Emei Shan without further data (old material), genitalia nos. 1388/00 & 1436/01 Nässig (BMNH; 2 specimens figured by D'Abrera 1995: 101, top row).

Compared with the following species, *A. homora* is smaller (obviously except specimens from Emei Shan), darker and more greyish, the forewing ocellus is not always absent on the dorsal side, the antennae are smaller, and the ♂ genitalia differ slightly, but constantly.

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Aglia ingens n. sp.

Holotype (Figs. 1, 2): ♂, PR China, Sichuan province, Gongga Shan, near Moxi village, 29°40′ N, 102°06′ E, VI. 2003, leg. local people, received from Viktor SINIAEV IX. 2003, CSNB; genitalia no. 936/03 NAUMANN.

Paratypes (33 ♂♂, 6 ♀♀): Allotype ♀ (Figs. 5, 6), same data as holotype; 6 ♂♂ (1 of them Figs. 3, 4), same data as holotype, ♂ genitalia no. 939/03 & 951/03 NAUMANN. – 27 ♂♂, 5 ♀♀ Gongga Shan, 2600–3200 m, 24. IV.–15. V. 2001, 29°41′ N, 101°58′ E, leg. V. SINJAEV & A. PLUTENKO, coll. R. BRECHLIN; ♂ genitalia nos. 408-01, 409-01, 410-01, 411-01, 434-01, 435-01 BRECHLIN.

Type deposition: Holotype and allotype will be deposited in ZMHU, 3 of the CSBN paratypes remain in the collection of the senior author, and one paratype each is deposited in CASB, CBH, and SMFL; the others in coll. R. BRECHLIN, Pasewalk, except 2 ♂♂, 2 ♀♀ of these which will be deposited in coll. Museum WITT, Munich.

Derivatio nominis: The new species is named after its extraordinary size within the genus: INGENS (lat.) = very large. The name is to be interpreted as a noun in apposition.

Description

♂ (Figs. 1–4): Ground colour reddish brown. Antennae dark ochreous, 13.0–13.8 mm (holotype 13.2 mm) long, quadrupectinate, with 44 segments, length of rami 1.9 mm at maximum (holotype 1.8 mm). Head and thorax in ground colour, but labial palpi, tibiae and tarsi somewhat darker greyish. Abdomen lighter, sprinkeled with some dark greyish hairs, claspers hardly covered with long hair in ground colour. Length of right forewing from basis to apical tip 47–53.5 mm (average 51.2 mm, n = 7; holotype: 52 mm), that of the hindwing at anal angle 32–36 mm (average 34 mm, n = 7; holotype: 35 mm). Forewing in ground colour, but some pattern elements slightly visible: Antemedian band somewhat darker, with a small whitish area anterior and mainly costal, median and postmedian area sprinkeled with dark greyish patches, the forewing ocellus without any pattern on dorsal side, it is only visible from above as a shadow of the dark marking of the wing underside shining through. A shadow of the darker reddish brown median band only slightly visible in few samples; postmedian band in anterior part darker than ground colour, in posterior part pinkish white, slightly bent outwardly, and coloured most intensively in costal area. Outer portion of postmedian area more homogenous, apically pinkish white, apex somewhat falcate.

Hindwing sprinkeled only in the costal part where the postmedian line ends with an intensively coloured reddish brown patch. Median part hairy, in homogenous ground colour, eyespot nearly round, of 8–9 mm in diameter (average 8.6 mm, n = 7; holotype: 8 mm). Outer ring black, inner part dark violet blue, with the typical white marking; most specimens, including the holotype, have that element somewhat reduced and show only an anterior white halfmoon, sometimes also a small posterior white dot, not a full Greek Tau. Postmedian band broad dark grey and pinkish white, postmendian area again homogenous in light ground colour.

Ventral side somewhat inverse to the dorsal view: The forewings are more homogenous, show a typical dark eyespot, and the hindwing is coloured more intensively, sprinkeled with patches, and has no eyespot. The forewing eyespot is composed by a black outer ring and an inner violet blue portion with a white central dot, the marginal area darker and suffused with dark patches. Hindwing with a dark reddish brown median band, centrally with a white Tau, postmedian band darker grey and pinkish white.

♀ (Figs. 5, 6): The ♀ shows all elements similar to the ♂♂ and differs only by the typical sexual dimorphism: It is somewhat larger, forewing length is 57 mm, hindwing length 37 mm, and the forewing is little rounder. Antennae 12 mm long, bipectinate, with 45 segments, length of rami 0.4 mm in maximum.

♂ genitalia (Figs 15, 16, 24, 25): Structures are typical for the genus and show many similarities with *A. homora,* but differ in some characters constantly: Generally the genitalia are the largest in the genus. The uncus is bifid, bent ventrally, and there is as opposing part below a dorsal tip of the fused transtilla and gnathos. Valves with large sacculus, ending with a central marginal tip, then followed by the apical part of the valves which is curved outward at its dorsal apex. From around the central tip there is an inner margin of the valves, which is strongly sclerotized, and which ends with an inner scobinate process which is tapering ventrally to a very pointed tip (Figs. 24–25). Saccus and juxta nearly completely reduced, the aedeagus long, thin, and bent in around a 90°-angle to the ventral side. The tergum of the 8th abdominal segment is well developed (Fig. 15a).

Discussion

A. ingens n. sp. is morphologically closest (and probably also most closely related) to *A. homora* but differs from that species by several characters: *A. homora* is clearly smaller (perhaps except for Sichuan specimens, BMNH). Also the hindwing ocellus is smaller in *A. homora,* as well as the antennae are shorter in that species. Generally *A. homora* is of much paler and ochreous ground colour compared to the reddish specimens of *A. ingens* n. sp. The forewing ocellus is always present also on the dorsal side in *A. homora,* and the forewing apex is stronger falcate in the ♂♂. In the ♂ genitalia, aside from differences in size, we found *A. homora* having the internal process much more rounded and without the sharply tapering, pointed end (which is also true for the Emei Shan in Sichuan specimens in BMNH!), and the valves constantly do not have the typical, centrally tapering shape of the apex of *A. ingens* n. sp. Considering that there are only very minor diffences in ♂ genitalia between the two species *A. tau* and *A. japonica,* it is encouraging to find such clear differences in the genitalia of *A. homora* in comparison to *A. ingens* n. sp.

While *A. homora* was collected in the months of April to June so far (all recent material in April and May, only

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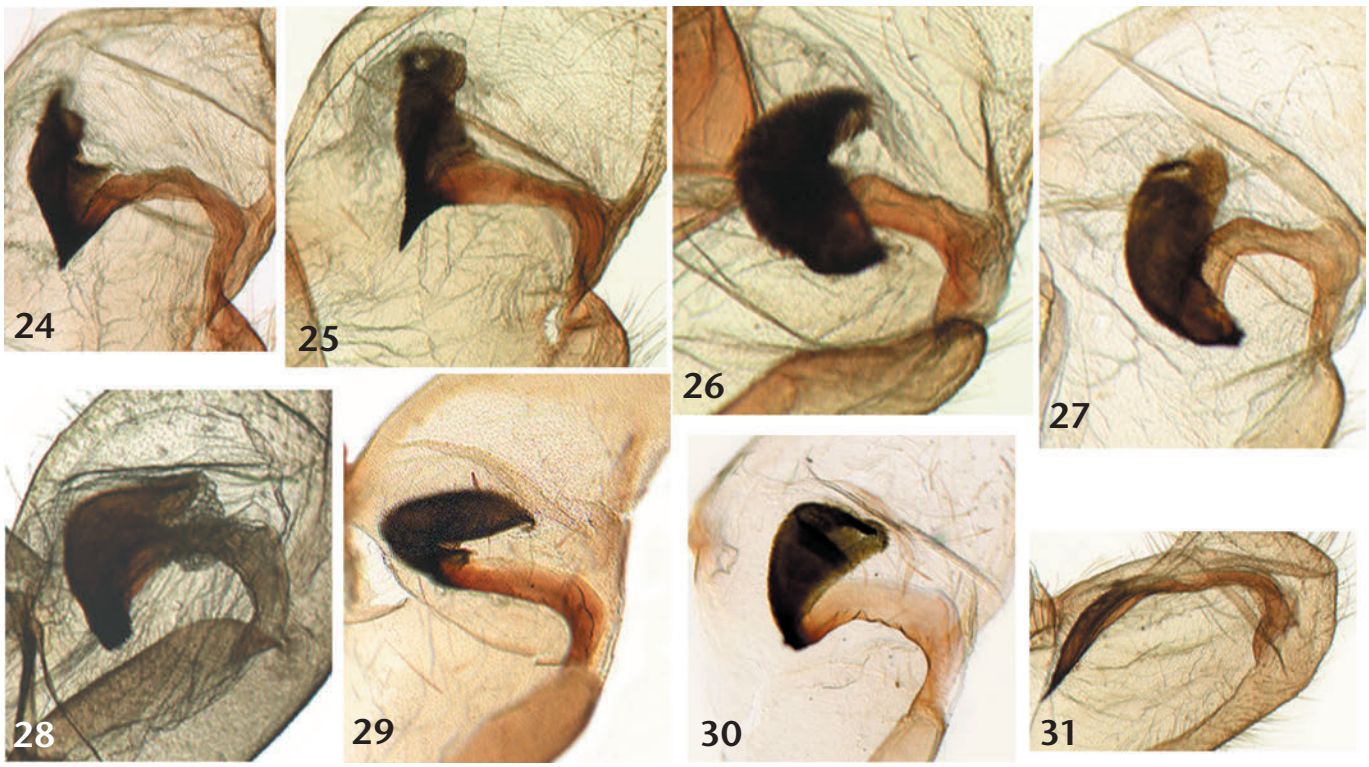

Plate 3: ♂ genitalia, enlarged details of the inner part of the right valves of *Aglia ingens, A. homora* and *A. tau* for comparison. — **Figs. 24–25:** *Aglia ingens,* repeated from Plate 2. — **Figs. 26–30:** *Aglia homora*. **Fig. 26:** From Shaanxi, detail from Fig. 17. **Fig. 27:** From Shaanxi, detail from Fig. 18. **Fig. 28:** From Gansu, detail from Fig. 19. **Fig. 29:** From Sichuan, detail from Fig. 20, left valve, mirrored. **Fig. 30:** From Sichuan, detail from Fig. 21. — **Fig. 31:** *Aglia tau,* from Finland, detail from Fig. 22. — Enlarged details from direct scans. Not to the same scale.

the Höne specimens from Shaanxi, in MAKB, in June), *A. ingens* n. sp. was collected in June. Both species are active at night, flying before midnight, but while *A. homora* is a strong and wild flyer and hardly to catch by a net at light, the ♂♂ of *A. ingens* n. sp. fly slowly and soon calm down on the ground around the light traps (pers. observation V. Sinjaev).

It is interesting to note on one side the wide distribution of the relatively homogenous species *A. homora* in the mountain ranges from the Qinlingshan in Shaanxi about 700 km in general direction southwest via southeastern Gansu and probaly Longmen Shan to Emei Shan in Sichuan, and then again 700 km to the west from Shaanxi via Liupan Shan and Minshan of Gansu to the southwestern parts of Qinghai, all around the temperate mountain ranges of West China (Map 2). On the other side a well distinguishable species can be found in the high mountain chain of Gongga Shan in Sichuan (relatively close to Emei Shan, with just 150 km distance in between both localities). It might be possible that *A. ingens* n. sp. may be endemic to Gongga Shan.

Similar observations exist for other taxa within Saturniidae: e.g., the widespread *Loepa miranda* Atkinson (*in* Moore), 1865 is known from Nepal to the northern parts of Vietnam, but there a second, closely related species, *L. roseomarginata* Brechlin, 1997, can be found sympatrically on Mt. Fan Si Pan which is probably endemic to this area.

To be continued (acknowledgements and bibliography will follow in part 2).

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